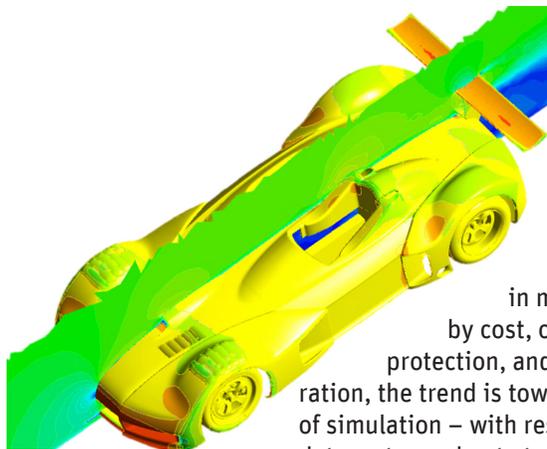# Remote Visualization on ANSYS Enterprise Cloud

ANSYS engineering simulation software is used by product development teams around the world, in order to understand and predict how their products will perform in the real world. Simulation helps ensure that the design will be reliable and meet expectations; it also helps ensure faster time to market by reducing the need for late-stage design iterations. Today, whether designing a car, an airplane, an oil drill, a cell phone, or a new medical device, simulation is a core competence for companies seeking to create a competitive edge for their products.

Engineering simulation also places significant demands on the IT environment. End-users need good interactive graphics-capable systems for setting up simulation models and reviewing results. Predicting performance is accomplished by solving large matrices of non-linear equations, a computational load that typically requires many processors deployed on a high-performance computing cluster. A single end-user may generate hundreds of GBytes of data per simulation project. These requirements – graphics, compute capacity, storage – are complicated by the growing globalization of engineering, with the resources and data needed by end-users in multiple locations. Driven by cost, operational efficiency, IP protection, and a need for global collaboration, the trend is toward centralized deployment of simulation – with resources consolidated in the datacenter and not at each end-user's desktop or department.

With the trend toward datacenter-based deployment, many ANSYS customers are asking if the cloud is a good fit for engineering simulation. Clearly, the elastic capacity of on-demand high-performance computing on the cloud has high value, allowing business agility and the ability to optimize resources as workloads increase or decrease throughout the development cycle. But many ANSYS customers interested in the cloud express concern about moving large datasets back to the end-user's desktop for analysis and graphical post-processing. Indeed, a process that involves moving simulation datasets between the end-user and the cloud is inefficient – with users waiting hours for data to transfer and network capacity becoming a limiting factor.

The solution is to implement a cloud strategy that enables the end-to-end simulation process – from interactive problem setup, through computation, to graphical post-processing. This strategy pushes the use of the cloud beyond batch processing, maintaining the data on the cloud and enabling end-users to interrogate it using remote visualization technology.

Can this strategy of remote visualization work for a 3D graphics-intensive engineering simulation workload? These workloads have special challenges:

- Interactive manipulation of complex 3D geometric models requires "desktop-like" responsiveness, even on relatively high latency networks.

- Simulation models can require 128GB of RAM, or more, and thus require high-memory graphics servers that may or may not be part of the datacenter infrastructure.
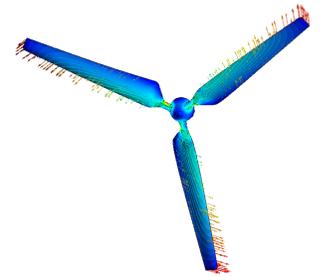
Overcoming these challenges is not trivial, but with the right tools and right deployment architecture, end-to-end simulation on the cloud is feasible today.

ANSYS and NICE have delivered a solution for remote visualization on the ANSYS Enterprise Cloud. Our solution – depicted in the graphic below - includes:

- ANSYS interactive applications running on high-memory application servers, with remote rendering of graphics on a separate graphics server. This enables large real-world simulation models to access the memory they need, while still using a high quality graphics processor for interactive post-processing.

- NICE Desktop Cloud Visualization (DCV) for remote visualization. Leveraging the hardware-accelerated graphics of the graphics server, DCV delivers remote desktop access optimized for 3D applications, enabling fluid and responsive experience in motion, while preserving pixel-perfect quality for still images. Designed to work smoothly over LAN, WiFi, as well as high-latency WAN connections, it just requires a lightweight client running Windows, Linux or Mac OS/X. Your data remains in the cloud, only pixels travel to the user's device, and highly compressed protocols reduce the bandwidth requirement to just a few megabits.

- The DCV Proxy Server. The Proxy Server channels all connections through standard HTTP protocol and enables remote access to work smoothly over most corporate firewalls and filters. All communication and data transfers between large-memory and graphics instances are performed over a Virtual Private Cloud (VPC) network, offering a single standard end point to connect to.

The resulting performance speaks for itself. At ANSYS, we've tested this configuration from multiple countries and continents, with end-users reporting "workstation-like" performance.

Want to see for yourself? Take the ANSYS Test Drive at www.ansys.com/testdrive, or contact us at testdrive@ansys.com to learn more about taking simulation to the AWS cloud.